Jpn J Ophthalmol
Vol 48: 598–601, 2004

Effect of Latanoprost 0.005% and Brimonidine 0.2% on Intraocular Pressure After Phacoemulsification and Intraocular Lens Implantation Surgery

It is well known that intraocular pressure (IOP) may increase significantly in the first 24 h following cataract surgery. The mechanism causing the rise may be retention of viscoelastic substances that block the aqueous outflow, or inflammatory reaction in the anterior chamber, blockage of the trabecular meshwork by lenticular debris, watertight wound closure, or hyphema.[1,2]

In this prospective study we evaluated the effect of preoperative latanoprost 0.005% or brimonidine 0.2% administration on postoperative IOP after phacoemulsification cataract extraction with foldable posterior chamber (PC) intraocular lens (IOL) implantation.

Case Report

Seventy-seven patients (mean age 61.6 ± 10.9 years) (77 eyes) with uncomplicated cataracts having phacoemulsification with PC IOL implantation were included in this prospective randomized double-masked clinical trial. The eyes were randomly assigned to one of three groups: application of latanoprost 0.005% (26 patients) or brimonidine 0.2% (26 patients) 2 h before surgery and control (25 patients). IOP was measured 6, 12, and 24 h postoperatively with the Goldmann applanation tonometer.

The preoperative IOP assessment was taken at 0900 hours and 1700 hours on the day before surgery. The baseline IOP was determined by calculating the mean value of both IOP measurements. Surgery was performed with peribulbar anesthesia.

The changes from baseline at each time within each of the treatment groups were evaluated statistically with Wilcoxon signed rank tests, while the Mann-Whitney *U* test of the group median was used for comparing the three groups.

Table 1 shows preoperative and postoperative IOP for the latanoprost, brimonidine, and control groups. There were no significant differences in preoperative IOP among the three groups. In the latanoprost and brimonidine groups, there was no statistically significant increase in mean IOP at 6, 12, or 24 h postoperatively ($P > 0.05$). However, there were statistically significant increases in mean IOP at 6, 12, and 24 h postoperatively in the control group compared with the preoperative mean IOP ($P < 0.01$). At 6, 12, and 24 h postoperatively, IOPs were significantly higher in the control group than in the latanoprost and brimonidine groups ($P < 0.05$). We did not see any ocular or systemic complications.

Comments

An ideal drug should provide prophylaxis against the postoperative spike in IOP with minimal ocular and systemic

Table 1. Intraocular pressure (IOP) over time

	Mean IOP ± SD (mmHg)		
Time (h)	Latanoprost	Brimonidine	Control
		NS	
Preoperative	12.32 ± 2.36	12.85 ± 1.69	13.20 ± 1.97
		NS	
Postoperative		(P = 0.015)	
6	12.73 ± 1.88	13.23 ± 2.21	17.21 ± 2.03*
		(P = 0.024)	
		(P = 0.020)	
12	13.18 ± 1.84	13.15 ± 2.19	18.82 ± 2.33*
		(P = 0.018)	
		(P = 0.0001)	
24	12.18 ± 2.38	12.42 ± 1.63	17.58 ± 2.86*
		(P = 0.0001)	

NS, not significant.
*$P < 0.05$ (compared with preoperative values).

adverse effects, rapid onset of action for protection in the immediate postoperative period, and sustained action that can cover the 24-h postoperative ocular hypertensive period without requiring a repeat dose.[1]

Both latanoprost and brimonidine prevented IOP increase after phacoemulsification at 6, 12, and 24 h postoperatively in our study. The IOP lowering effects of latanoprost and brimonidine applied 2 h before surgery were compared with control data. When the three groups were compared at each time period, postoperative IOP was significantly lower after treatment with latanoprost or brimonidine than in the control group ($P < 0.05$). We also compared the IOP lowering effects of latanoprost and brimonidine, and there were no significant differences ($P > 0.05$).

Scherer showed that latanoprost, given as a single dose at the end of phacoemulsification, significantly lowered IOP compared with controls 24 h after surgery.[3] It is known that postoperative IOP increases can start about 2 to 4 h after cataract surgery.[4] Rainer[5] reported that brimonidine 0.2% failed to reduce the IOP increase after cataract surgery. However, in our study, brimonidine 0.2% was found effective for prevention of an IOP increase after phacoemulsification surgery. Thus, the administration of brimonidine 2 h before surgery can be effective.

In conclusion, our study has shown that both latanoprost 0.005% and brimonidine 0.2% were effective and safe in preventing ocular hypertension in the early postoperative period after phacoemulsification with PC IOL implantation.

Key Words: brimonidine, intraocular pressure, latanoprost, phacoemulsification

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Received: January 9, 2004 / Accepted April 9, 2004
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DOI 10.1007/s10384-004-0116-5

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